

HEAT CONTROLLER, INC.

INSTALLATION, OPERATION & MAINTENANCE MANUAL

Inverter Single Zone Ductless Mini Split Heat Pump

VMH 30/36 Series
Version C

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SAFETY PRECAUTIONS

- Please read this installation manual completely before installing the product.
- If the power cord is damaged, replacement work shall be performed by authorized personnel only.
- Installation work must be performed in accordance with all local and national codes by authorized personnel only.
- Contact an authorized service technician for repair, maintenance or installation of this unit.
- All the pictures in the instructions are for explanation purposes only, and may differ from the actual product you purchased.
- The design and specifications are subject to change without prior notice for product improvement. Consult with the sales agency or manufacturer for details.

- The seriousness of safety precautions is classified by the following indications:


WARNING

This symbol indicates the possibility of death or serious injury.


CAUTION

This symbol indicates the possibility of injury or damage to property.


WARNING

- 1) Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electrical shock fire, and may void the warranty.
- 2) Use the manufacturer's specified and supplied parts only.
- 3) Install in a strong and firm location which is able to withstand the unit's weight. If the strength is insufficient or installation is not properly done, the units can fall and cause injury.
- 4) For electrical work, follow all local and National electrical codes and these installation instructions. An independent circuit and single outlet must be used. If electrical circuit capacity is not enough or a defect found in electrical work, it may cause electrical shock or fire.
- 5) Use the specified cable, connect tightly and clamp the cable so that no external force will be acted on the terminal. If connection is loose, it may cause excessive heat build up.
- 6) Wiring routing must be properly arranged so that control board cover is fixed properly. If control board cover is not fixed perfectly, it will cause heat build up at connection point of terminal, fire or electrical shock.
- 7) When carrying out piping connection, take care not to let air substances other than the specified refrigerant go into refrigeration circuit. Otherwise, it will cause lower capacity, abnormal high pressure in the refrigeration cycle, explosion and injury.
- 8) Do not modify the length of the power supply cord or use an extension cord, and do not share the single outlet with other electrical appliances. Otherwise, it may cause fire or electrical shock.

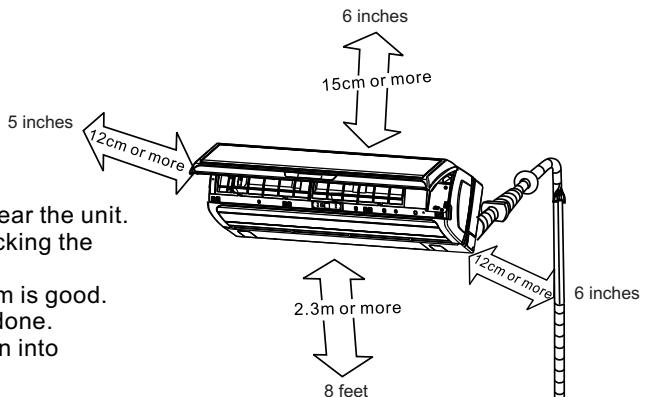

CAUTION

- 1) This equipment must be properly grounded and installed with and ground leakage current breaker, otherwise it may cause electrical shock.
- 2) Do not install the unit in place where leakage of flammable gas may occur. If gas leaks and accumulates near or surroundings the unit, it may cause fire.
- 3) Carry out drainage piping as mentioned in installation instructions. If drainage is not properly done, water may enter the room and damage the furniture.

SELECT THE BEST LOCATION

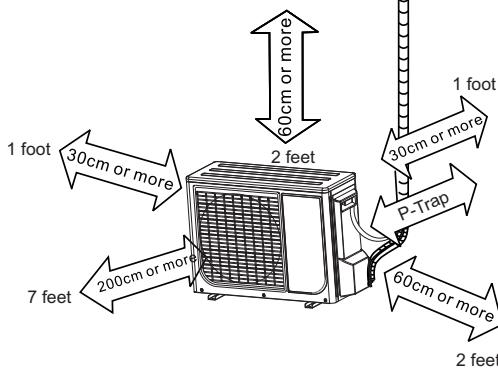
Indoor unit

- There should not be any heat source near the unit.
- There should not be any obstacles blocking the air circulation.
- A place where air circulation in the room is good.
- A place where drainage can be easily done.
- A place where noise prevention is taken into consideration.
- Do not install the unit near a door way.
- Ensure the clearness indicated by arrows in the figure on the right are adhered to leaving space away from any walls, ceiling, or other obstacles.
- There should not be any direct sunlight.
If unavoidable, sunlight prevention should be taken into consideration. Direct sunlight may block the ability of the unit to reduce the signal from the remote controller.



Outdoor unit

- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiating from the condenser is not obstructed.
- There should not be any animals or plants kept near the unit which could be affected by hot air discharged.
- Ensure the clearances indicated by the arrows on the right are adhered to, leaving space away from any walls, fences, plants, or other obstacles.



NOTE: See outdoor installation precautions on page 7 for additional information.

ACCESSORIES

Number	Name of Accessories	Qty
1	Installation Plate	1
2	Clip Anchor	5-8(depending on models)
3	Self-tapping Screw A ST3.9x25	5-8(depending on models)
4	Seal	1
5	Drain Joint	1
6	Remote controller	1
7	Self-tapping Screw B ST2.9x10	optional parts
8	Remote controller holder	1

NOTE: In addition to the parts above, other parts may need to be purchased locally.
such as copper line sets, etc.

INDOOR SECTION

1 FIT THE INSTALLATION PLATE

NOTE:

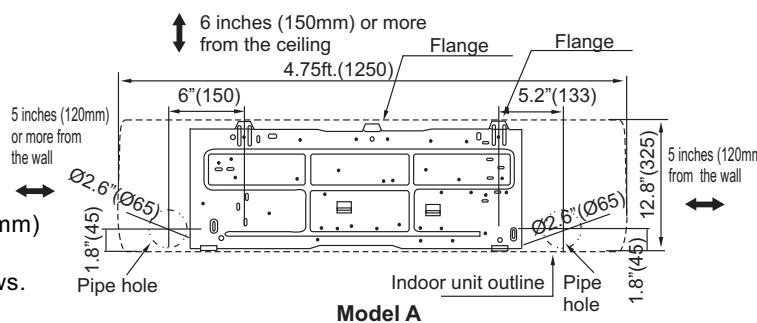
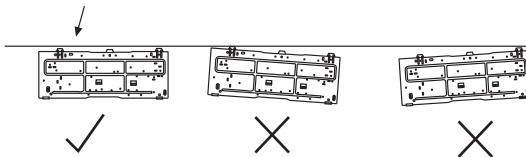
The installation plate provided with the machine may differ from appliance to appliance.
(Use wall studs for best anchorage)

● **Fit the Installation Plate**

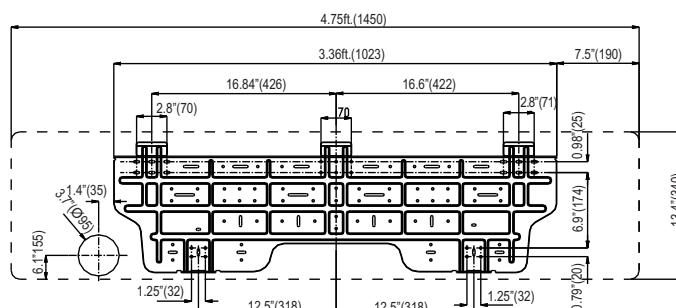
1. Fit the installation plate horizontally on structural parts of the wall with the appropriate clearance around the installation plate.
2. Drill holes in the wall according to the wall structure and corresponding mounting points on the installation plate. If the wall is made of brick, concrete or the like, drill eight 3/16"(5mm) diameter holes in the wall. Insert Clip anchor for appropriate mounting screws.
3. Fit the installation plate on the wall with eight (8) type "A" screws.

NOTE: Dimensions are in inches (mm) unless otherwise stated.

Correct orientation
of Installation Plate



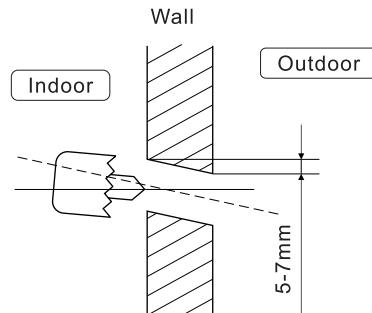
Model A



Model B

2 DRILL A HOLE IN THE WALL

1. Determine hole positions according to left and right side of the installation plate. The hole center is obtained by measuring the distance as shown in the diagram above.
2. Drill the piping plate hole with Ø2.55in(65mm) hole-core drill.
3. Drill the piping hole at either the right or the left and the hole should be slightly slanted to the outdoor side.
4. Always use wall hole conduit when drilling metal grid, metal plate or the like.

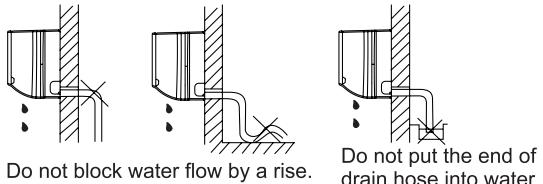


INDOOR SECTION

3 CONNECTIVE PIPE AND DRAINAGE INSTALLATION

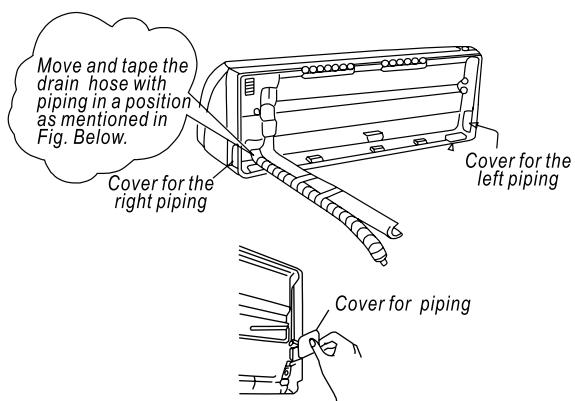
Drainage

1. Run the drain hose sloping downward.
The figures on the right show improper installation methods.
2. When connecting extension drain hose, insulate the connections, do not let the drain hose slack.



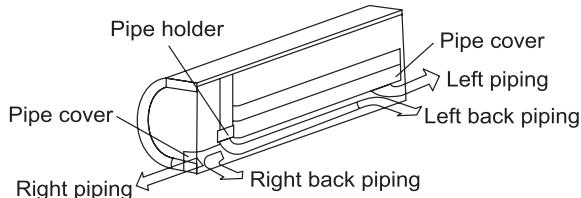
Connective pipe installation

1. For the left-hand and right-hand piping, remove the pipe cover from the side panel.
 2. For the rear-right-hand and rear-left-hand piping, install the piping as shown.
 3. Bundle the tubing, connecting cable, and drain hose with tape securely, evenly as shown in Figure on the right.
- Because the condensed water from rear of the indoor unit drains to the ponding box before drainage through the drain hose, be sure not to place anything inside the ponding box.



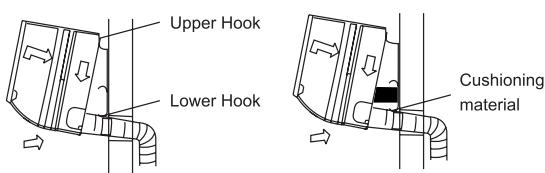
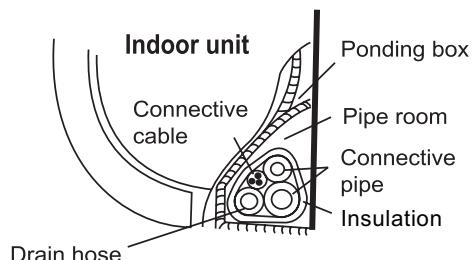
CAUTION

- Connect the indoor unit first, then the outdoor unit.
- Do not allow the piping to come out from the back of the indoor unit.
- Be careful not to let the drain hose slack.
- Heat insulate both the auxiliary piping.
- Be sure that the drain hose is located at the lowest side of the bundle. Locating at the upper side can cause drain pan to overflow inside the unit.
- Never intertwine the condensate piping the power the power wire with any other wiring.
- Run the drain hose sloped downward to drain out the condensed water freely.



Indoor unit installation

1. Pass the piping through the hole in the wall.
2. Hook the indoor unit onto the upper portion of installation plate(Engage the indoor unit with the upper edge of the installation plate). Ensure the slots are properly seated on the installation plate hooks by moving it in left and right.
3. Piping installation can easily be done by placing a temporary piece of styrofoam between the unit and the wall. After piping is complete, be sure to remove the styrofoam.
4. Press the lower left and right side of the unit against the installation plate until the slots hook onto and engage with the installation wall plate.



INDOOR SECTION

4

CONNECTING THE COMMUNICATION CABLE

INDOOR UNIT

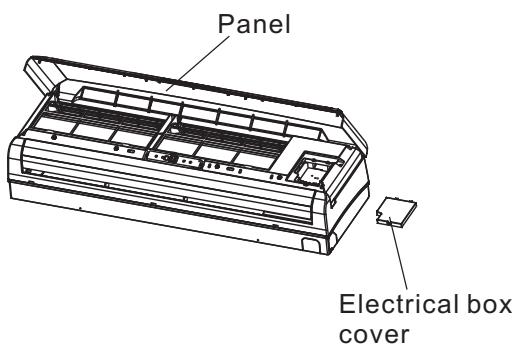
Electrical work

- Electric safety regulations for the initial Installation should meet all local and national electric codes
1. Voltage power should be in the range of 90%~110% of rated voltage.
 2. The creepage protector and main power switch should be at least installed in the power circuit 1.5 times the capacity of Max. Current of the unit should be installed in power circuit.
 3. Ensure the air conditioner is grounded well.
 4. Use the Electrical Connection Diagram located on the panel of the outdoor unit and indoor unit to connect the wire properly.
 5. An individual branch circuit and single receptacle used only for this air conditioner must be available.
 6. HCl recommends the use of 600V THHN 14 AWG/4 conductor unshielded stranded copper cable, however NEC always prevails.

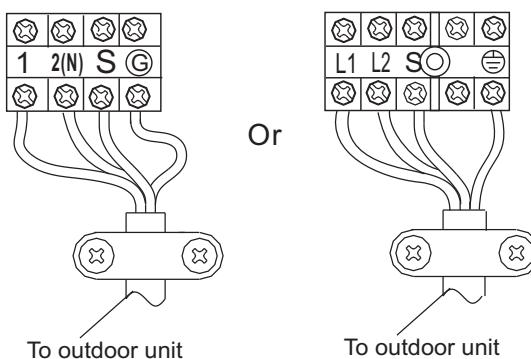
Connect the cable to the indoor unit

NOTE: Before performing any electrical work, turn off the main power to the system.

1. The inside and outside connecting cable can be connected without removing the front grille.
2. Lift the indoor unit panel up, remove the electrical box cover by loosening the screw.
3. Ensure the color of wires of outdoor unit and the terminal Nos. match the indoor's respectively.
4. Wrap those cables not connected with terminals with insulation tape, so that they will not touch any electrical components. Secure the cable onto the control board with the cord clamp.



Terminal block of indoor unit



OUTDOOR SECTION

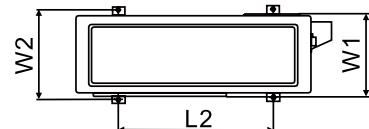
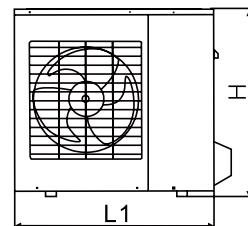
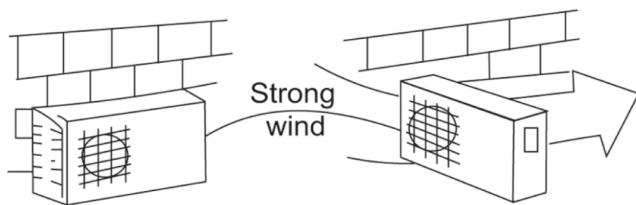
1 OUTDOOR INSALLATION PRECAUTION

- Install the outdoor unit on a rigid base to prevent increased noise levels and vibration.
- Ensure the air outlet is not blocked by any objects such as plants or walls, etc.
- If the installation location is exposed to strong winds, ensure the unit is placed lengthwise along the wall or provide a switchable baffle to block strong wind gusts from entering the unit.
- If suspending the unit with a bracket, follow the bracket manufacturer's installation instructions.
- Use a raised concrete pad or concrete blocks to provide a solid base and level surface - securely anchor the unit down with bolts. See table & figure below.
- In a snowy area, install the outdoor unit on a raised platform higher than drifting snow.

Settlement of outdoor unit

- Anchor the outdoor unit with a bolt and nut Ø3/8"(Ø10mm) or Ø5/16"(Ø8mm) tightly and horizontally on a concrete or rigid mount.

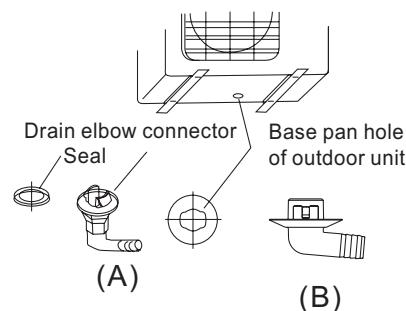
Outdoor unit dimension in(mm)(L1xHxW1)	Mounting dimensions	
	L2(mm)	W2(mm)
26.4x21.3x9.8 (670x540x250)	18.9in.(481)	10.9in.(276)
29.9x23.2x11.2 (760x590x285)	20.9in.(530)	11.4in.(290)
30.5x21.4x12.2 (775x545x310)	23.6in.(600)	12.6in.(320)
32.3x23.4x13.0 (820x595x330)	20.6in.(523)	13.4in.(340)
33.3x27.6x12.6 (845x700x320)	22.1in.(560)	13.2in.(335)
35.4x33.9x12.4 (900x860x315)	23.2in.(590)	13.1in.(333)



2 DRAIN JOINT INSTALLATION

NOTE: The pictures of the drain joint may very from the actual part that come with the unit.

Push the seal onto the end of the drain elbow connector (Fig. A), then insert the drain elbow connector into the hole in the bottom of the base pan of the unit (Fig. B) until it makes a click sound and is firmly in place. Add an additional drain hose to direct the condensate away from the base of the unit by placing a hose on the end of the hose barb. This drain hose is not included with the unit and must be purchased.



OUTDOOR SECTION

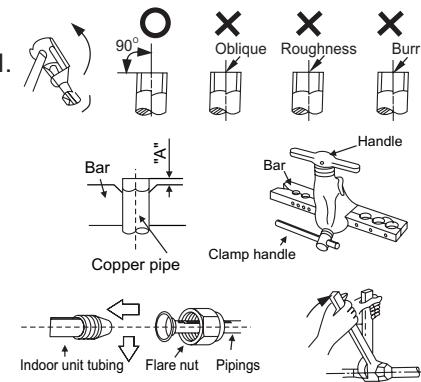
3 REFRIGERANT PIPE CONNECTION

Use a line set of copper pipe to connect the indoor and outdoor units.

Flaring

- Measure the distance between the indoor and outdoor sections. Cut a pipe with a pipe cutter, a little longer than the required measured distance.
- Remove flare nuts attached to indoor and outdoor unit, then put them on the copper pipe, having completed burr removal.
- Flare the ends of the pipe by firmly holding the copper pipe in a die per the dimensions shown in the table below.

Outer diam. in. (mm)	A in.(mm)	
	Max.	Min.
Ø1/4"(Ø6.35)	.05"(1.3)	.02"(0.7)
Ø3/8"(Ø9.52)	.06"(1.6)	.04"(1.0)
Ø1/2"(Ø12.7)	.07"(1.8)	.04"(1.0)
Ø5/8"(Ø16)	.08"(2.2)	.08"(2.0)
Ø3/4"(Ø19)	.09"(2.4)	.08"(2.0)



Tightening connection

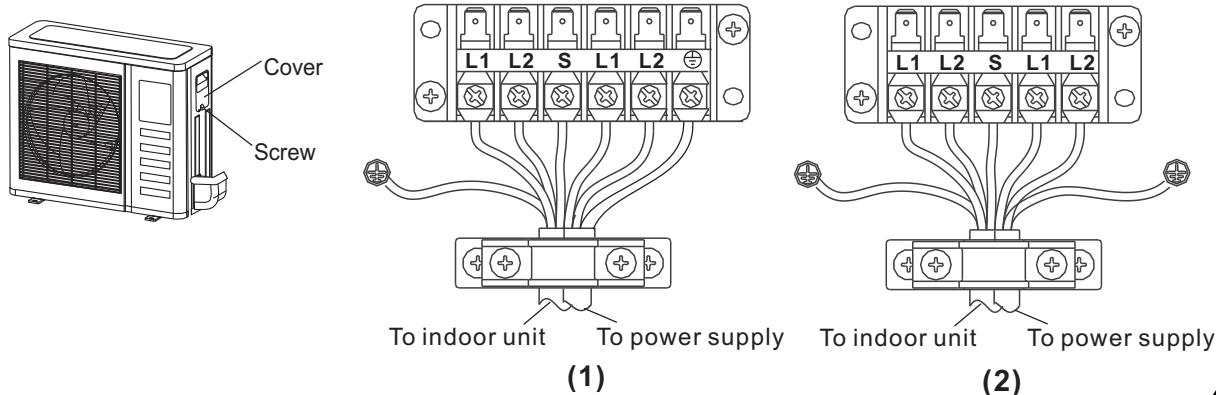
- Align pipes to be connected.
- Sufficiently tighten the flare nut with fingers, and then tighten it with a spanner and torque wrench as shown.
- Excessive torque can break nut depending on installation conditions, use torques provided in the table to the right.

Outer diam.	Tightening torque	Additional tightening torque
Ø1/4"(Ø6.35mm)	11.07 ft•lbf (153kgf.cm)	11.79 ft•lbf (163kgf.cm)
Ø3/8"(Ø9.52mm)	18.44 ft•lbf (255kgf.cm)	19.17 ft•lbf (265kgf.cm)
Ø1/2"(Ø12.7mm)	25.82 ft•lbf (357kgf.cm)	26.55 ft•lbf (367kgf.cm)
Ø5/8"(Ø16mm)	33.20 ft•lbf (459kgf.cm)	36.65 ft•lbf (479kgf.cm)
Ø3/4"(Ø9mm)	47.95 ft•lbf (663kgf.cm)	49.40 ft•lbf (683kgf.cm)

4 CONNECT THE CABLE TO THE OUTDOOR UNIT

- Remove the electrical control board cover from the outdoor unit by loosening the screw.
- Connect the connective cables to the terminals as identified with their respective matched numbers on the terminal block of indoor and outdoor units. See the section of the manual called "connecting the communication cable" on page. 6.
- Secure the cable onto the control board with the cord clamp.
- To prevent water from entering the unit, form a loop or p-trap in the cable as illustrated in the diagram on page 3.
- Wrap unused wires with electrical tape, so they do not touch any other electrical or metal parts.

Terminal block of outdoor unit



OUTDOOR SECTION

5 AIR PURGING

1. Airpurging

Air and moisture in the refrigerant system have undesirable effects. Therefore, the indoor unit and tubing between the indoor and outdoor unit must be leak tested and evacuated to remove any noncondensables and moisture from the system.

Check that each tube (both liquid and gas side tubes) between the indoor and outdoor units have been properly connected and all wiring for the test run has been completed.

Pipe length and refrigerant amount:

Units are pre-charged for 16.5 ft. (5m) total line set length, additional charge is needed for longer line sets lengths. Charge adjustments are not required for line sets less than 16.5 ft (5m)

Capacity Btu/h	Pipe Size		Standard Length (ft)	Max Elevation (ft)	Total Line Length (ft)		Additional Refrigerant oz/ft
	Gas (in)	Liquid (in)			Min.	Max.	
30-36k	5/8 (16mm)	3/8(9.52mm)	*16.5 (5m)	32 (9.75m)	10 (3m)	82 (25m)	.4 (40g/m)

*Unit charge located on rating plate includes enough refrigerant for 16.5 feet of line set.

* Charge adjustment is not required on line set lengths less than 16.5 feet.

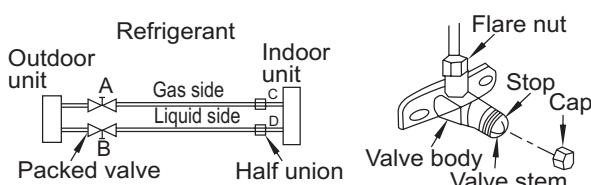
Ensure any R-410A refrigerant is added to the unit in liquid form.

CAUTION

Open the valve stem until it hits against the stop. Do not try to open it further.

Securely tighten the valve stem cap with a spanner or wrench.

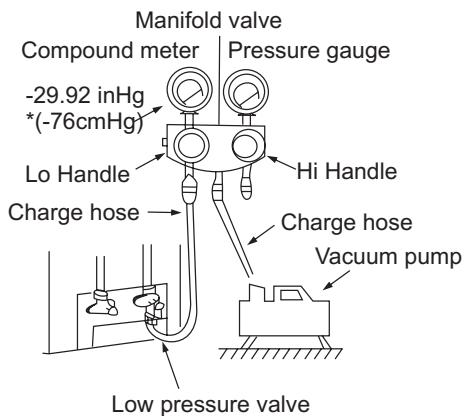
See tightening torque table on page 8 to properly tighten and torque the valve stem cap.



2. When using the Vacuum Pump

NOTE: Refer to the manifold valve manufacturer's instructions before use.

1. Completely tighten the flare nuts, A, B, C, D, (see figure on page 10) connect the manifold valve charge hose to a charge port of the low pressure valve on the gas side.
2. Connect the charge hose connection to the vacuum pump.
3. Fully open the Lo handle of the manifold valve.
4. Operate the vacuum pump to evacuate. After starting evacuation, slightly loose the flare nut of the low pressure valve on the gas side and check that the air is entering. (Operation noise of the vacuum pump changes and a compound meter indicates 0 instead of minus)
5. After the evacuation is complete, fully close the lo handle of the manifold valve and stop the operation of the vacuum pump.
- Evacuate for 15 minutes and more and check that the compound meter indicates -29.92inHg(-76cmHg).
6. Turn the stem of the low pressure valve B about 45° counter-clockwise for 6~7 seconds after the gas units out, then tighten the flare nut again. Make sure the pressure display in the pressure indicator is a little higher than the atmosphere pressure.
7. Remove the charge hose from the Low pressure charge hose.
8. Fully open the packed valve stems B and A.
9. Securely tighten the cap of the packed valve.



OUTDOOR SECTION

5 TEST OPERATION

3. Safety and leakage check

Use soapy water or a leakage detector to check for leaks as follows:

1. Soap water method:

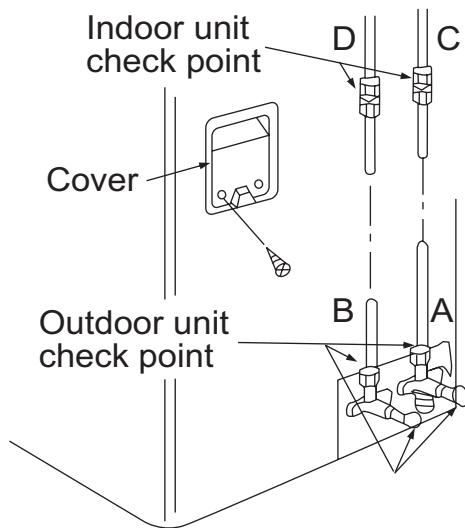
Apply a soap solution water or a liquid neutral detergent onto the indoor unit connections and outdoor unit connections with a soft brush to check for leaks in the connections of the piping. If bubbles room, it indicates that the pipes have leaks.

2. Leak detector

Use the leak detector per the manufacturer's instructions to check for leakage.

CAUTION NOTE:

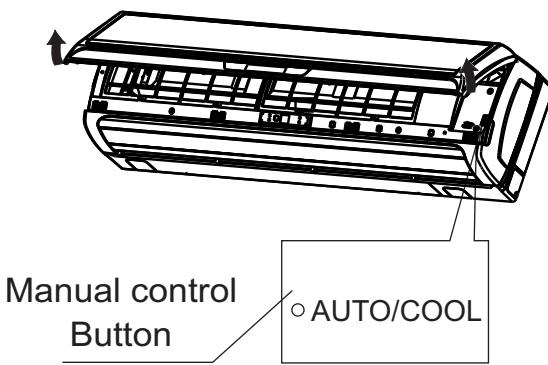
A: Lo pressure valve B: Hi pressure valve
C and D are ends of indoor unit connection.



4. Test running

Perform a test run after completing the leak check:

- Check that all tubing and wiring have been properly connected.
 - Check that the gas and liquid side service valves are fully open.
1. Connect the power, press the ON/OFF button on the remote controller to turn the unit on.
 2. Use the MODE button to select COOL, HEAT, AUTO and FAN to check if all the functions work properly.
 3. When the ambient temperature is lower than 62°F(17°C), the unit cannot be controlled by the remote controller to run in cooling mode, manual operation needs to be used.
 - Hold the panel sides and lift the panel up to an angle until it remains fixed with a clicking sound.
 - Press the Manual control button to select the AUTO or COOL, the unit will operate under Forced AUTO or COOL mode(see User Manual for details).
 4. The manual test operation should last about 30 minutes, giving the installing contractor an opportunity to check that the unit is operating properly and the installation was done successfully.



Design, material, performance data and components
subject to change without notice.

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THE QUALITY LEADER IN CONDITIONING AIR

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